QUALITY CONTROL REPORTS FOR

SEMI DENSE BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC(QB)/2014-15 16.06.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Mr. H.S. Nataraj,** Contractor, Bangalore.
NAME OF THE WORK	:	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	16.06.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	82	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	300	Min. 220

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/AIV/2014-15 16.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP,
Agency	**Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.48	22.68	22.58

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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16.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP,
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Name of the Work	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.02	22.22	22.12

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Shape_T/2014-15 : 16.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 16.06.2014

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Result : Flakiness Index = **11.58%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index **24.84%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Shape_T/2014-15 : 16.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 16.06.2014

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Result : Flakiness Index = **12.35%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **25.60%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Stripping/2014-15 17.06.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of the work	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	17.06.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Sp_Wa/2014-15

17.06.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	17.06.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2023	2024	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1268	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2022	2025	2026	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	755	757	757	
6	Weight of oven dried aggregate	W_4 g	2004	2010	2015	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.654	2.655	2.662	2.657
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.719	2.709	2.701	2.710
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.90%	0.75%	0.55%	0.73%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Bit/2014-15 17.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. H.S. Nataraj,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
SAMPLE I/D	Roads inVinayaka Layout 1st stage in Ward No.07, BBMP, Bangalore.
DATE OF TESTING	17.06.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/Bit/2014-15 17.06.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. H.S. Nataraj,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
SAMPLE I/D	Roads inVinayaka Layout 1st stage in Ward No.07, BBMP, Bangalore.
DATE OF TESTING	17.06.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	28.39	5.98	5.98	94.02	90-100
4.75	255.9	53.87	59.85	40.15	35-51
2.36	60.35	12.71	72.56	27.44	24-39
1.18	42.35	8.92	81.47	18.53	15-30
0.3	36.35	7.65	89.12	10.88	9-19
0.075	30.22	6.36	95.49	4.51	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.25	6.80	6.80	93.20	90-100
4.75	260.5	54.96	61.76	38.24	35-51
2.36	56.32	11.88	73.64	26.36	24-39
1.18	32.62	6.88	80.53	19.47	15-30
0.3	29.56	6.24	86.76	13.24	9-19
0.075	26.35	5.56	92.32	7.68	3-8

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Job No.: CTCE/BBMP/W. No 07/HSN/SDBC/AGG/2014-15 17.06.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. H.S. Nataraj,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 2nd Main, 1st stage in Ward No.07, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/446/2012-13 Dated: 16.03.2013
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	17.06.2014

Total Weight of Sample: **5100** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	365	7.2	7.16	92.84	90-100	
4.75	2590	50.8	57.94	42.06	35-51	
2.36	685	13.4	71.37	28.63	24-39	
1.18	510	10.0	81.37	18.63	15-30	
0.3	265	5.2	86.57	13.43	9-19	
0.075	475	9.3	95.88	4.12	3-8	

Total Weight of Sample: **5200** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	330	6.3	6.35	93.65	90-100	
4.75	2585	49.7	56.06	43.94	35-51	
2.36	780	15.0	71.06	28.94	24-39	
1.18	440	8.5	79.52	20.48	15-30	
0.3	380	7.3	86.83	13.17	9-19	
0.075	420	8.1	94.90	5.10	3-8	

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